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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,765	03/29/2004	Norihiro Arai	04199/LH	4800
1933	7590	12/21/2005	EXAMINER	
FRISHAUF, HOLTZ, GOODMAN & CHICK, PC			CHEN, WEN YING PATTY	
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Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/812,765	<b>Applicant(s)</b> ARAI ET AL.	
	<b>Examiner</b> Wen-Ying P. Chen	<b>Art Unit</b> 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 October 2005.
- 2a) ☒ This action is FINAL.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 and 10-18 is/are pending in the application.
- 4a) Of the above claim(s) 2,4-6 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,7,8,10,11 and 13-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant's Amendment filed Oct. 25, 2005 has been received and entered. Claims 9 and 19-20 are cancelled per the Amendment. Therefore, claims 1, 3, 7-8, 10-11 and 13-18 are pending in the current application.

### ***Claim Rejections - 35 USC § 103***

Claims 1, 3, 8, 10-11 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2002/0063824) in view of Fujimori et al. (US 2003/0063244).

With respect to claims 1 and 17 (Amended): Ha et al. disclose in Figures 4 and 5 a liquid crystal display device comprising:

a liquid crystal element comprising:

a front substrate which is arranged at a front side of the liquid crystal element, which corresponds to a viewing screen side of the display device (Paragraph 0005);

a back substrate (element 210) which is arranged at a back side of the front substrate so as to be opposed to the front substrate;

at least one first electrode which is formed on an internal surface of the back substrate (Paragraph 0005);

at least one thin film transistor (elements 251, 221, 252 combined) which is arranged on the internal surface of the back substrate and driven by a drive signal;

at least one second electrode (element 270) which is arranged on the internal surface of the back substrate so as to be opposed to the at least one first electrode, and which is connected to the thin film transistor (through element 261), thereby forming at least one pixel in a region that does not overlap with a region where the thin film transistor is formed (as shown in Figure 4) and that is included in an area where the at least one first electrode and the at least one second electrode are opposed to each other;

a liquid crystal layer which is sandwiched between the front substrate and the back substrate (Paragraph 0005);

at least one reflective film (element 290) which is provided at a side of the back substrate with respect to the liquid crystal layer so as to correspond to a part of the region in which the at least one pixel is formed that does not overlap with the region where the thin film transistor is formed (as shown in Figure 4), such that a reflective portion for reflecting incident light and a transmissive portion (element 291), in a region other than the reflective portion, for transmitting incident light are formed in the at least one pixel;

a color filter which is provided on the internal surface of the front substrate so as to correspond to the at least one pixel (Paragraph 0005);

a front polarizing plate and a back polarizing plate which are arranged at the front side and a back side of the liquid crystal element, respectively (Paragraph 0012); and

a backlight which is arranged at a back of the back polarizing plate (Paragraph 0006).

Ha et al. fail to disclose that an opening is formed by removing the color filter at a position such that the opening corresponds to a part of the reflective portion, and that a liquid

crystal layer thickness adjusting layer is provided in at least a region corresponding to the reflective portion between the front substrate and the back substrate, in order to set a thickness of the liquid crystal layer in the reflective portion to be thinner than a thickness of the liquid crystal layer in the transmissive portion.

However, Fujimori et al. disclose in Figure 16 a liquid crystal display device comprising a color filter (element 42) at a position such that the opening (element 42') corresponds to a part of the reflective portion, and that a liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2', having diffusion properties) is provided in at least a region corresponding to the reflective portion between the front substrate and the back substrate, in order to set a thickness of the liquid crystal layer (element 50) in the reflective portion to be thinner than a thickness of the liquid crystal layer in the transmissive portion.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Ha et al. wherein the color filter comprises of openings corresponding to the reflective region in which a thickness adjusting layer is provided on the color filter corresponding to the openings such that the thickness of the liquid crystal layer at the reflective region is thinner than a thickness of the liquid crystal layer in the transmissive region as taught by Fujimori et al., since Fujimori et al. teach that the scattering of the light at the reflection portion can be enhanced (Paragraph 0146).

As to claims 3 (Amended): Fujimori et al. further disclose in Figure 16 that a thickness of the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') is set such that a thickness of the color filter (element 42) in the reflective portion is equal to a thickness of the color filter in the transmissive portion.

As to claim 8: Fujimori et al. further disclose in Paragraph 0146 that the liquid crystal layer thickness adjusting layer comprises a transparent insulation film.

As to claim 10: Fujimori et al. further disclose in Figure 16 that the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') fills the hole (element 42') formed in the color filter (element 42).

As to claim 11: Fujimori et al. further disclose in Figure 16 that the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') fills the hole (element 42') formed in the color filter (element 42) and covers the color filter.

As to claim 18 (Amended): Fujimori et al. further disclose in Figure 16 that a thickness of the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') is set such that a thickness of the color filter (element 42) in the reflective portion is equal to a thickness of the color filter in the transmissive portion and that the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') fills the hole (element 42') formed in the color filter (element 42) and covers the color filter.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2002/0063824) and Fujimori et al. (US 2003/0063244) in view of Baek (US 2002/0041351).

Ha et al. and Fujimori et al. disclose all of the limitations set forth in claim 1, but fail to specifically disclose that the liquid crystal element comprises a homogeneous liquid crystal layer.

However, Baek discloses in the Abstract a transfective liquid crystal display device including a homogeneous liquid crystal in which liquid crystal molecules are oriented

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substantially in parallel with surfaces of a pair of substrate without being twisted between the substrates in a non electric field state where no electric field is applied.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Ha et al. and Fujimori et al. wherein the liquid crystal layer is of a homogeneous liquid crystal as taught by Baek, since Baek teaches that by having homogeneous liquid crystal allows the display to exhibit an optical retardation when the voltage is applied so that a high contrast ratio can be achieved (Abstract).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2002/0063824) and Fujimori et al. (US 2003/0063244) in view of Ha (US 2003/0160914).

Ha et al. and Fujimori et al. disclose all of the limitations set forth in claim 1, but fail to disclose that the reflective layer comprises a reflective surface on which depressions and protrusions are formed.

However, Ha discloses in Figure 4 a liquid crystal display device comprising a reflective layer (element 19b), which comprises a reflective surface on which depressions and protrusions are formed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Ha et al. and Fujimori et al. wherein the reflective layer comprises a reflective surface on which depressions and protrusions are formed as taught by Ha, since Ha teaches that the uneven reflective surface

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results in minimized specular reflection and improves diffusion of incident light (Paragraph 0025).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2002/0063824) and Fujimori et al. (US 2003/0063244) in view of Ozawa et al. (US 2004/0004681).

Ha et al. and Fujimori et al. disclose all of the limitations set forth in claim 1, but fail to specifically disclose that the liquid crystal layer in the reflective portion exhibits a retardation of  $\frac{1}{4}$  wavelength and the transmissive portion exhibits a retardation of  $\frac{1}{2}$  wavelength to a light transmitted through in the non electric field state.

However, Ozawa et al. disclose in the Abstract a transflective liquid crystal display device wherein in transmissive display regions and the reflective display regions are set to a  $\frac{1}{2}$  wavelength and a  $\frac{1}{4}$  wavelength respectively, with no voltage applied.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Ha et al. and Fujimori et al. wherein the liquid crystal layer in the reflective portion exhibits a retardation of  $\frac{1}{4}$  wavelength and the transmissive portion exhibits a retardation of  $\frac{1}{2}$  wavelength to a light transmitted through in the non electric field state as taught by Ozawa et al., since Ozawa et al. teach that with such configuration of the liquid crystal layer an improved display brightness in the transmission mode and an excellent visibility can be achieved (Abstract).



Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2002/0063824), Fujimori et al. (US 2003/0063244) and Ozawa et al. (US 2004/0004681) in view of Baek (US 2002/0041351).

Ha et al., Fujimori et al. and Ozawa et al. disclose all of the limitations set forth in claim 14 and Ha et al. further discloses in Paragraph 0012 that the liquid crystal display device further comprising: a front retardation plate and a back retardation plate arranged between the polarizing plates and the liquid crystal layer.

Ha et al., Fujimori et al. and Ozawa et al. fail to specifically disclose that the slow axes of the retardation plates are orthogonal to each other and that the transmission axes of the polarizing plates are orthogonal to each other.

However, Baek discloses in Figure 6 a transfective display device comprising of lower and upper retardation plates (elements 142 and 145) and lower and upper polarizing plates (elements 152 and 155), wherein the slow axes of the retardation plates are perpendicular to each other and the transmission axes of the polarizing plates are perpendicular to each other (Paragraph 0081) so as to offset the optical retardation of the liquid crystal layer.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Ha et al., Fujimori et al. and Ozawa et al. wherein the slow axes of the retardation plates are orthogonal to each other and that the transmission axes of the polarizing plates are orthogonal to each other as taught by Baek, since Baek teaches that such configuration of the polarizing plates and the retardation plates help to prevent light leakage when displaying the dark state of the LCD device (Paragraph 0081).

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2002/0063824), Fujimori et al. (US 2003/0063244), Ozawa et al. (US 2004/0004681) and Baek (US 2002/0041351) in view of Iijima (US 2002/0154257).

Ha et al., Fujimori et al., Ozawa et al. and Baek disclose all of the limitations set forth in claim 15, but fail to disclose that a scattering reflective plate is arranged between the front polarizing plate and the liquid crystal layer.

However, Iijima discloses in Figure 18 a scattering reflective plate (element 16) arranged between the front polarizing plate (element 13) and the liquid crystal layer (element 4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Ha et al., Fujimori et al., Ozawa et al. and Baek wherein a scattering reflective plate is arranged between the front polarizing plate and the liquid crystal layer as taught by Iijima, so that the image light of the display is uniformly scattered towards the viewer.

### ***Response to Arguments***

Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

Regarding claims 17 and 18 not being addressed in the previous Office Action, claims 17 and 18 were left out due to typographical error. Claim 17 contained the same limitations as claim 3 and claim 18 contained the same limitations as claim 11, therefore were to also be rejected with the references as applied to claims 3 and 11

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wen-Ying P. Chen whose telephone number is (571)272-8444. The examiner can normally be reached on 8:00-5:00 M-F.

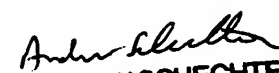
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wen-Ying P Chen  
Examiner  
Art Unit 2871

WPC  
12/15/05

  
ANDREW SCHECHTER  
PRIMARY EXAMINER